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EXAMINER

UHLIR, NIKOLAS J

ART UNIT	PAPER NUMBER
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1773

DATE MAILED: 11/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/830,215

Applicant(s)

KUBOTA ET AL.

Examiner

Nikolas J. Uhler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 11-19 and 22-32 is/are rejected.
- 7) ☒ Claim(s) 20 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/07/2004
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to the amendment/arguments dated 08/11/2004. Applicants amendment is sufficient to overcome the following previously applied rejections: 1) The rejection of claims 1-9, 11-15, 17-19, 23-24, and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (EP0522758) in view of Hatada et al. (US4732814); and 2) The rejection of claims 1-6, 11, 14-15, 17, 20-22, 27, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinonome et al. (EP0398075) in view of Hatada et al. (US4732814). The remaining rejections over Kinoshita are maintained and modified as set forth below. Thus, case is not in condition for allowance.

Information Disclosure Statement

2. The examiner has considered the information disclosure statement dated 10/7/2004. A signed and initialed copy of this document accompanies this office action.

Claim Objections

3. Claims 23-24 are objected to because of the following informalities: These claims contain a typographical error. Specifically, the claims require particles having an average particle diameter of 0.01-2mm and 0.01-1mm respectfully. From the specification, it is clear that mm should be μm . Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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5. Claims 1-7, 11-19 and 22-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (US5527594) in view of Hatada et al. (US4732814).

6. Regarding claims 1-3, Kinoshita teaches an optical tape that comprises a polyester film substrate, a coating layer (A) formed on one side of the substrate, and a coating layer (B) formed on the other side of the substrate (column 2, lines 40-52). The film is used as a base for a magneto-optical recording medium (column 24, lines 18-25). The A layer is composed of a resin binder and a lubricant (column 4, lines 32-33). Suitable lubricants include vertical protuberance forming resins such as polyamide, polyacrylate, polysulfone, etc. (column 4, lines 40-50). Suitable resin binders include polyesters, including those formed by reacting a glycol such as ethylene glycol with a polycarboxylic acid such as terephthalic acid or 2,6 naphthalenedicarboxylic acid (column 5, lines 43-50; column 6, lines 7-17; column 11, lines 36-50). One of ordinary skill in the art would recognize that the reaction product between ethylene glycol and terephthalic acid/2,6 naphthalenedicarboxylic acid is polyethylene terephthalate (PET) or polyethylene 2,6 naphthalenedicarboxylate (PEN).

7. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use PET or PEN as the polyester in Kinoshita as the reference expressly teaches that polyesters formed by reacting a glycol such as ethylene glycol with a polycarboxylic acid such as terephthalic acid or 2,6 naphthalenedicarboxylic acid are suitable for use.

8. Further, the film of Kinoshita is biaxially stretched (column 7, lines 53-67), and protuberances are formed on its surface (column 5, lines 17-29). Further, Kinoshita

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teaches that various additive resins may be incorporated into the A layer so as to prevent oligomer deposition. Suitable additives include heat resistant resins, such as polyetherimide (column 15, lines 32-38 and column 17, lines 17-21).

9. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize polyetherimide in the A layers of Kinoshita, as the reference explicitly teaches that polyetherimide is suitably used in these layers.

10. It is the examiners position that when polyetherimide is introduced into the A layers of Kinoshita, a polymer alloy results. The examiner interprets the term, "polymer alloy" to require nothing more than a mixture of two or more unreacted polymers. The polyester/polyetherimide mixture in the A layers of Kinoshita clearly meet this definition, and so read on this limitation.

11. Kinoshita fails to the density and height of the protrusions required by claims 1-3.

12. With respect to this deficiency, Hatada teaches that the number and height of protrusions on the surface of a biaxially oriented film that is used as a substrate for a magnetic recording medium has an impact on the conversion characteristics and running properties of the film (column 7, lines 28-50). Specifically, Hatada teaches that 10-50 protuberances/ μm^2 ($10\text{e}6$ - $5\text{e}7$ protuberances/ mm^2) should be present on the surface of the film, and the protuberances should have a height in the range of 5-30nm (column 7, lines 28-50). If less than $10\text{e}6$ protuberances/ mm^2 are on the surface, the running property of the film degrades whereas if greater than $5\text{e}7$ protuberances/ mm^2 are on the surface, the surface roughness increases and dropout is caused (column 7, lines 40-50). If the protuberances have a height less than 5nm, the running property of

the film is poor, whereas if the protuberances have a height greater than 30nm, the electromagnetic conversion characteristics of the medium are degraded (column 7, lines 29-40).

13. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form 10^6 - 5×10^7 protuberances/mm² having a height in the range of 5-30nm as taught by Hatada on the surface of the biaxially oriented film taught by Kinoshita.

14. One would have been motivated to make this modification in view of the fact that the Kinoshita film is designed to be utilized as a recording media substrate, and the fact that Hatada teaches that biaxially oriented films that are used as recording media substrates should have 10^6 - 5×10^7 protuberances/mm² having a height of 5-30nm on their surface so that they will have good running properties and conversion characteristics.

15. Regarding the combination of Kinoshita with Hatada. The examiner acknowledges that Kinoshita teaches a fundamentally different type of recording medium (magneto-optic) than that taught by Hatada (magnetic). While one of ordinary skill in the art would clearly recognize that the recording layers of Kinoshita and Hatada are different, one of ordinary skill in the art of magnetic recording media would know that film substrates that are suitable for use in magneto-optical recording media can be substantially identical to those used for magnetic recording media using ferromagnetic recording layers. This is evidenced by the fact that both Kinoshita (magneto optic) and Hatada (magnetic) utilize biaxially oriented polyester films as substrates. Thus, one of

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ordinary skill in the art would have been motivated to make the proposed modification and would have a reasonable expectation of success in doing so.

16. Regarding claim 4. The requirement that "at least some" of the micro protrusions be "made of" polymer 1 or polymer two merely requires one or more micro protrusions to be at least partially formed from polymer 1 or polymer 2. Though not expressly taught by Kinoshita or Hatada, it is logical to believe that at least some of the protrusions will be at least partially made of PET or PEN. This is because the protrusions of the Kinoshita film are formed by the inclusion of particles into the polyester base (column 4, lines 30-60). These particle effect a phase separation or stretching in the layer, resulting in protuberances (column 5, lines 10-25). Therefore, as the protrusions are formed with a phase separation from the polyester, at least some, if not all of the protrusions will be composed of at least the polyester of the substrate.

17. Claim 5 is met as set forth above for claim 4.

18. Claim 6 requires the Tg of polymer 2 to be higher then the Tg of polymer 1. Kinoshita teaches that the polyester film utilized for coating layer B can be the same as that for coating layer A (column 11, lines 2-5). Coating layer B is taught to have a Tg of no more then 70⁰C (column 11, lines 10-13). Thus, if coating layer A and coating layer B can be the same material, then in effect Kinoshita teaches that coating layer A has a Tg no greater then 70⁰C. Bearing this in mind, Kinoshita teaches that the heat resistant resin (including polyetherimide) has a Tg of not less then 150⁰C (column 17, lines 14-21). Thus, the limitations of claim 6 are met.

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19. Claim 7 is met as set forth above. PET and PEN are listed in the instant specification as being compatible with polyetherimide.
20. Claim 11 is met as set forth above for claim 1 when PET is utilized.
21. Claims 12 and 13 require the number of protrusions having a height of $\geq 50\text{nm}$ to be $\leq 3000/\text{mm}^2$, and the number of protrusions having a height $\geq 30\text{nm}$ to be $\geq 1500/\text{mm}^2$. Hatada as set forth above teaches away from forming protuberances having a height $> 30\text{nm}$. Specifically, Hatada teaches that if the protuberances have a height greater than 30nm , the characteristics of the medium are degraded (column 7, lines 29-40).
22. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the height of all of the protrusions on the surface of the film taught by Kinoshita as modified by Hatada to be less than 30nm , as Hatada teaches that if protuberances having a height $> 30\text{nm}$ are formed, the characteristics of the film are degraded.
23. Regarding claims 14-16, wherein the applicant requires a three layer ABC structure, wherein layer A has a surface roughness Ra_a of $0.2\text{-}10\text{nm}$, layer C has a surface roughness Ra_c of $1\text{-}30\text{nm}$, such that $Ra_c > Ra_a$. Kinoshita teaches a 3 layer laminate comprising a base layer, layer A as described above for claim 1, layer B (same as layer A described above but with no lubricant and equivalent to applicants claimed A layer) on the opposite side of the base from the A layer (column 13, lines 50-60, and column 2, 40-50). The A layer has a surface roughness Ra of $0.005\text{-}0.5\mu$, whereas the surface roughness of the B layer has a surface roughness Ra of $\leq 0.005\mu$. Thus, the

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limitations of claims 14-16 are met when the B layer has a surface roughness less than 0.005μ and the A layer has a surface roughness of 0.005μ .

24. Regarding claim 17, Kinoshita teaches that layer B can be formed from the same polymers as layer A (column 11, lines 3-7).

25. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize PET or PEN to form layer B, as Kinoshita teaches that PET and PEN can be utilized for layer A and that layer B can be made from the same polymers as layer A.

26. Claims 18 and 19 are met as set forth above for claims 12-13.

27. Regarding claim 22, Kinoshita teaches that instead of using inert particles as the lubricant in layer A, a surfactant can be used (column 4, lines 40-67).

28. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a surfactant or particles as the lubricant in layer A, as Kinoshita expressly teaches the equivalence of surfactants to particles as suitable materials for use as the lubricant.

29. When a surfactant-based lubricant is used instead of a particulate-based lubricant, the limitations of claim 22 are met.

30. Regarding claim 23, the examiner interprets "particle diameter of 0.01-1mm" to mean $0.01-1\mu\text{m}$, as it is evident from the specification that the particles have a diameter on the micron scale, not the millimeter scale. With this in mind, as noted above Kinoshita teaches the use of surfactant-based lubricants and particulate-based lubricants. Suitable particles for the lubricant have an average diameter of preferably

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0.05-0.3 μ (column 4, line 52). 0.5-40% by weight of lubricant is added to layer A (column 5, lines 37-40).

31. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize add 0.5% by weight of particles having a diameter of 0.05-0.3 μ to layer A of Kinoshita, as the reference expressly teaches using particles of this diameter and in this amount as a lubricant.

32. Claim 24 is met as set forth for claim 23.

33. Regarding claims 25-26, the examiner interprets "composed" in claim 25 as open language that allows for other components aside from polyester, and polyetherimide to be present in the film. Thus, the limitations of claims 25-26 are met as set forth above for claims 1, 9, and 16.

34. Regarding claim 27, Kinoshita teaches forming a magneto optical recording layer on the surface of the substrate film (column 25, lines 5-8). A magneto optical; recording layer is "a" magnetic layer, and so meets the limitations of this claim.

35. Regarding claims 28 and 29, while Kinoshita only teaches the use of magneto-optical recording layers, one of ordinary skill in the art of magnetic recording media at the time the invention was made would know that film substrates that are suitable for use in magneto-optical recording media are substantially identical to those used for magnetic recording media using ferromagnetic recording layers. This is evidenced by the fact that both Kinoshita (magneto-optic) and Hatada (magnetic) utilize biaxially oriented polyester films as substrates. As shown by Hatada, magnetic layers comprising thin films of Fe, Fe-Co, Co-Ni or particles of these materials in a binder can be used as

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a recording layer on the surface of a biaxially oriented polyester film (column 6, line 55-column 7, line 10). The examiner notes that the alloys recited by Hatada are known to be ferromagnetic.

36. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a thin film of ferromagnetic material such as Fe, Fe-Co, or Co-Ni, or particles of these material in a binder to form the magnetic layer of Kinoshita as modified by Hatada.

37. One would have been motivated to make this modification in view of the fact that the prior art recognizes the equivalency of layers comprising a ferromagnetic thin film, layers comprising particles of a ferromagnetic material, and layers comprising magneto-optical recording materials as being suitable for use as a recording layer on a biaxially oriented polyester substrate.

38. Regarding claim 30, this claim is met as set forth above for claims 1-3.

39. Regarding claims 31-32, these claims are met as set forth above for claim 17.

Allowable Subject Matter

40. Claims 20-21 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

41. The following is a statement of reasons for the indication of allowable subject matter: Claims 20 and 21 require at the A layer to contain a defined amount of polyetherimide. When the B layer contains no polyetherimide, the A layer must contain between 10-40% by weight polyetherimide. If the B layer contains some nonzero

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amount of polyetherimide (up to 40% by weight in claim 20, up to 25% by weight in claim 21), the A layer must have a content of polyetherimide that is sufficient to meet the 2nd and 3rd inequalities in claims 20 and 21. The closest prior art to the instant invention is Kinoshita. Kinoshita teaches a biaxially oriented polyester that can be a blend of PET and polyetherimide, or PEN and polyetherimide. However, Yamamoto only teaches using 50-99.5% by weight of polyetherimide in layers A and B (see column 15 lines 39-50 and column 19, line 59-column 20, line 20). This concentration of Polyetherimide falls outside the range required by the applicant in the instant application. Furthermore, there is no teaching in the prior art that would motivate one of ordinary skill to modify the teachings of Kinoshita so as to arrive at a composition containing the amount of polyetherimide required by the applicant in claims 20 and 21.

Response to Arguments

42. Applicant's arguments filed 08/11/2004 have been fully considered but they are not persuasive. The applicant's arguments with respect to the previously applied Yamamoto and Shinonome references are moot, as the rejections based on these references have been withdrawn.

43. Regarding the Kinoshita reference, applicant argues that Kinoshita does not teach the polymer alloy required by claim 1. The examiner disagrees. Kinoshita clearly teaches the use of a blend of a polyester with a heat resistant resin, as set forth above. The Polyester can be PEN or PET, and the heat resistant resin can be a polyetherimide. The examiner maintains that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a blend of PET or PEN with a

polyetherimide simply by following the suggestion of Kinoshita. While the examiner does acknowledge that Kinoshita does not expressly teach PET or PEN, the examples in Kinoshita use polyester formed by reacting terephthalic acid with ethylene glycol. This is the most well known way to make PET. Furthermore, Kinoshita discloses that polyesters formed by the reaction of a polyol such as ethylene glycol and a polycarboxylic acid such as 2,6 naphthalene dicarboxylic acid can be used. This reaction would result in poly(ethylene-2, 6-naphthalenedicarboxylate).

44. Regarding the requirement of a polymer alloy. The examiner understands a polymer alloy to be a mixture of 2 or more polymers, i.e. a polymer blend. Applicant's blanket argument that the mixture of PET or PEN with polyetherimide is not a polymer alloy is not persuasive without at least an argument, if not evidence to support applicant's assertion. Here, the applicant has provided no basis for the assertion that a mixture of a polyester and polyetherimide is not a polymer alloy.

45. Finally, applicants reiterate their arguments as set forth in prior responses. The examiner maintains his previous responses to these arguments.

Conclusion

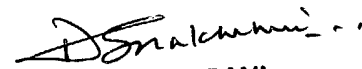
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhler whose telephone number is 571-272-1517. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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D. S. NAKARANI
PRIMARY EXAMINER